CARPENTRY/GEOGRAPHY

School/District: Iroquois High School
Jefferson Co. Schools

Subject: Designing a Subdivision

Academic Contact: Teresa Ohlmann
Address: 4615 Taylor Blvd.
Louisville, Ky 40215
Phone : 502-485-8269
Fax: 502-485-8033

Vocational Contact: Jim Bozeman
Address: SAME
Phone: SAME
Fax: SAME

Time Frame: 6 to 8 weeks

Grade Level: 9-12

KERA Academic Expectations: 1.7, 2.4, 2.16, 3.4, 5.5, 6.3

Description of Activity:

Carpentry and Geography students co-operated in the development, design and construction of a model subdivision. Carpentry students from the 11th and 12th grades joined students from the 9th grade Geography class to share carpentry skills, knowledge and ideas. Timberwolf Acres subdivision is a 50 acre development scaled down to a 48 x 48 model. The students began the design by creating a rough draft using given criteria and current zoning restrictions. A final design was selected from the drawings submitted. Students then worked individually on construction cost estimates using one of three floor plans and current prices of materials. Upon completion of the estimates, students began constructing the subdivision model in the carpentry lab. A summary was written by each student describing the process of the development of a subdivision. The group of students then presented the completed model of Timberwolf Acres to the school for display in the library.

Suggested Materials/Resources:

1 sheet of plywood
2 x 4 x 8" for houses
paint (variety of colors)
glue
model trees (optional)

CARPENTRY/GEOMETRY

School/District: George Rogers Clark Clark County ATC	**Subject: Pool Patio**
Academic Contact: Patricia Fraley Address: 620 Boone Ave Winchester, KY 40391 Phone: 606-744-6111 FAX: 606-745-2418	**Vocational Contact: Eric Highley Address: 650 Boone Ave. Winchester, KY 40391 Phone: 606-744-1250 FAX: 606-745-3921**
Time Frame: 3 Days	**Grade Level: 9-12**

KERA Academic Expectations: 2.8, 2.9, 2.10

Description of Activity:

Students will design a mosaic tiled patio around a circular pool with a radius of 12 feet. A 6-inch concrete foundation must first be laied before tiling the patio. Students will create a layout for the mosaic patio, determine the surface area for the patio, volume of the foundation, and estimate the cost.

Suggested Materials/Resources:

Graph paper
Calculator
Guest speaker: Louisville Tile

CARPENTRY/GEOMETRY

School/District: George Rogers Clark Clark County ATC	**Subject: Storage Building**
Academic Contact: Patricia Fraley **Address: 620 Boone Ave** **Winchester, KY 40391** **Phone: 606-744-6111** **FAX: 606-745-2418**	**Vocational Contact: Eric Highley** **Address: 650 Boone Ave.** **Winchester, KY 40391** **Phone: 606-744-1250** **FAX: 606745-3921**
Time Frame: 3 Days	**Grade Level: 9-12**

KERA Academic Expectations: 2.8, 2.9, 2.10

Description of Activity:

Students will design a concrete building 9.8 meters wide, 18 meters long with walls 4 meters high. The building will have 3 service doors (3 meters x 2.5 meters) and an access door (2.1 m x .85 m). The concrete blocks measure 41 cm x 23 cm. Students will create a 3-view diagram, an isometric diagram, itemized list of materials, price list, and a cost estimate.

Suggested Materials/Resources:

Graph paper
Calculator
Guest speaker: Contractor

CARPENTRY/APPLIED MATH

School/District: Whitesburg H.S.
Letcher County ATC

Subject: Housing

Academic Contact: Abigail Roark
Address: #1 College Hill
Whitesburg, KY 41858
Phone: 606-633-2339
FAX: 606-633-2447

Vocational Contact: Pete Cornett
Address: 610 Circle Drive
Whitesburg, KY 41858
Phone: 606-633-5053
Fax: 606-633-8084

Time Frame: Two and one-half weeks

Grade Level: 12

KERA Academic Expectations: 2.3, 2.5, 2.6, 2.7, 5.1, 5.2, 5.4, 5.5, 6.1, 6.2, 6.3

Description of Activity:

Can the student budget for a home?

Calculate simple and compound interest
Budget for monthly housing costs
Find housing rental costs
Find down-payment and buyer qualification
Find mortgage payments
Find total housing costs

The knowledge/content to be learned: Simple & compound interest, mortgage payments and total housing costs.

Assessment tasks: Homework, writing assignments, test and quiz.

Academic/Vocational Areas Involved:

Math
Carpentry
Electricity
Welding
Business Law

	Academic Teacher	Vocational Teacher
Name:	Vickie Buckle Donna Caldwell Eugene Hunley	Therlo Brock Robin Linton Randy Lewis Allen Adams
Address:	Leslie County High School P.O. Box 970 Hyden, KY 41749	KY Tech-Leslie County P.O. Box 902 Hyden, KY 41749
Phone:	606-672-2337	606-672-2859
Fax:	606-672-2858	606-672-5220

KERA Academic Expectations:

1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.11, 1.16, 2.4, 2.6, 2.7, 2.8, 2.9, 2.10, 2.12, 2.13, 2.16, 2.18, 2.22, 2.24, 2.27, 2.30, 2.36, 2.37, 2.38, 3.0, 4.0, 5.1, 6.2, 5.4, 5.5, 6.1, 6.2, 6.3.

Description of Activity:

In this project a mini-mall will be constructed in the commons area of Leslie County High School. Students will be involved in all phases of construction from planning to the actual development of the mall site. Upon completion of the construction, students will gain actual work experience by participating in a business venture.

Math, carpentry, and business law will combine work on the actual design and construction of the mini-mall. Scale drawings will be drawn of the mini-mall, prices for equipment and supplies will be researched, and a needs list for equipment and supplies will be developed. In the construction phase of the mall, students will work on the actual construction, set up a bookkeeping system, keep records for production, and fill out time sheets for the time which has been spent. After construction of the mall has been completed, the mini-mall will be publicized, the product will be presented, and spaces will be rented to the businesses.

Academic/Vocational Areas Involved:

Biology
Mathematics
Agriculture
Carpentry

	Academic Teacher	Vocational Teacher
Name:	David Christiansen Sharron Oxendine	Frank Hicks
Address:	George Rogers Clark High School 620 Boone Avenue Winchester, KY 40391	Clark County AVEC 650 Boone Avenue Winchester, KY 40391
Phone:	(606) 744-6111	(606) 744-1250
Fax:	(606) 745-2418	(606) 744-9979

KERA Academic Expectations:

2.1, 2.4, 2.7, 2.8, 2.10

Description of Activity:

The purpose of this activity is to construct a greenhouse in the back window of the biology classroom. The Math, Agriculture, and Biology classes will measure and design the project, while the Carpentry class will help the Biology class in its construction. Students in biology will seek donations from a local lumber company for the needed stock, plastic, shelves, and hardware. A local florist will develop a scheme for growing some exotic flowers to be used (potentially) in its business. Go Tech Prep!

Suggested Time Needed to Complete the Activity:

Three weeks

SUGGESTED INTEGRATION PRACTICES FOR ACADEMIC/VOCATIONAL EDUCATION PROGRAM(S)

Academic/Vocational Areas Involved:

Mathematics/Carpentry

Suggested Time Needed to Complete This Activity:

10 hours

Name of Schools:

Lee County High School/Lee County AVEC

Name of Vocational Teacher(s):

Ralph Stamper

Name of Academic Teacher(s):

Phyllis Hoskins

School Address:

P.O. Box 97, Beattyville, KY 41311/P.O. Box B, Beattyville, KY 41311

Telephone Number:

(606) 464-5005/(606) 464-5018

KERA Learner Standard(s) (I-75) Addressed By This Activity - List The Standard(s) In Brief Form:

2.4, 2.10
5.1

Description of Activity (Briefly Explain The Integration Activity That Was Conducted):

The math students were taught a unit in squares, learning to read rulers and figure squares. The carpentry students were taught how to make a building square. The math class applied the concepts they learned and built five school bus waiting houses with the assistance and guidance of the carpentry class.

SUGGESTED INTEGRATION PRACTICES FOR ACADEMIC/VOCATIONAL EDUCATION PROGRAM(S)

Academic/Vocational Areas Involved:

Science/Auto Technology

Suggested Time Needed to Complete This Activity:

5 hours

Name of Schools:

Lee County High School/Lee County AVEC

Name of Vocational Teacher(s):

Richard Kazsuk

Name of Academic Teacher(s):

Susan Easter

School Address:

P.O. Box 97, Beattyville, KY 41311/P.O. Box B, Beattyville, KY 41311

Telephone Number:

(606) 464-5005/(606) 464-5018

KERA Learner Standard(s) (I-75) Addressed By This Activity - List The Standard(s) In Brief Form:

1.3, 1.4
6.3

Description of Activity (Briefly Explain The Integration Activity That Was Conducted):

The science teacher explained the principles of external and internal combustion engines to the students. After completing questions on the concepts involved, the science students were taken to the auto tech shop and observed engines partially disassembled and some completely assembled. The students saw first-hand how an engine goes through its four strokes.

SUGGESTED INTEGRATION PRACTICES FOR ACADEMIC/VOCATIONAL EDUCATION PROGRAM(S)

Academic/Vocational Areas Involved:

Mathematics/Auto Technology

Suggested Time Needed to Complete This Activity:

3 hours

Name of Schools:

Lee County High School/Lee County AVEC

Name of Vocational Teacher(s):

Richard Kazsuk

Name of Academic Teacher(s):

Phyllis Hoskins

School Address:

P.O. Box 97, Beattyville, KY 41311/P.O. Box B, Beattyville, KY 41311

Telephone Number:

(606) 464-5005/(606) 464-5018

KERA Learner Standard(s) (I-75) Addressed By This Activity - List The Standard(s) In Brief Form:

2.7, 2.8
6.3

Description of Activity (Briefly Explain The Integration Activity That Was Conducted):

Math students spent several class days learning how to add, subtract, multiply and divide with fractions. They also completed a unit on the metric system. The class then moved into the auto tech shop to apply their knowledge of decimals and the metric system using micrometers.

SUGGESTED INTEGRATION PRACTICES FOR ACADEMIC/VOCATIONAL EDUCATION PROGRAM(S)

Academic/Vocational Areas Involved:

Mathematics/Auto Technology

Suggested Time Needed to Complete This Activity:

3 hours

Name of Schools:

Lee County High School/Lee County AVEC

Name of Vocational Teacher(s):

Richard Kazsuk

Name of Academic Teacher(s):

Phyllis Hoskins

School Address:

P.O. Box 97, Beattyville, KY 41311/P.O. Box B, Beattyville, KY 41311

Telephone Number:

(606) 464-5005/(606) 464-5018

KERA Learner Standard(s) (I-75) Addressed By This Activity - List The Standard(s) In Brief Form:

2.3, 2.10

Description of Activity (Briefly Explain The Integration Activity That Was Conducted):

The math students spent several lessons learning how to figure volume and how to convert metric units to standard (and vice-versa.) The class then moved into the auto tech shop applied the principles of volume and conversion to measuring engine size.

SUGGESTED INTEGRATION PRACTICES FOR ACADEMIC/VOCATIONAL EDUCATION PROGRAM(S)

Academic/Vocational Areas Involved:

Mathematics/Auto Technology

Suggested Time Needed to Complete This Activity:

3 hours

Name of Schools:

Lee County High School/Lee County AVEC

Name of Vocational Teacher(s):

Richard Kazsuk

Name of Academic Teacher(s):

Phyllis Hoskins

School Address:

P.O. Box 97, Beattyville, KY 41311/P.O. Box B, Beattyville, KY 41311

Telephone Number:

(606) 464-5005/(606) 464-5018

KERA Learner Standard(s) (I-75) Addressed By This Activity - List The Standard(s) In Brief Form:

1.9
2.8, 2.11

Description of Activity (Briefly Explain The Integration Activity That Was Conducted):

The math students studied principles of ratios and then applied the concepts they learned in the auto tech shop in a lesson dealing with transmission and differential ratios and their effect on engine RPM.

SUGGESTED INTEGRATION PRACTICES FOR ACADEMIC/ VOCATIONAL EDUCATION PROGRAM(S)

Academic/Vocational Areas Involved:

Principles of Technology/Physics/Auto Mechanics

Suggested Time Needed to Complete the Activity:

Name of School:

Breathitt County High School

Name of Vocational Teacher(s):

Jesse Tackett

Name of Academic Teacher(s):

M.E. Gross

School Address:

Bobcat Lane, Jackson, KY 41339

Telephone Number:

(606) 666-7511

KERA Learner Standard(s) (I-75) Addressed by This Activity--List the Standard(s) in Brief Form:

1.1, 1.2, 1.5, 1.8, 1.9, 1.10, 1.16
2.1, 2.3, 2.7, 2.8, 2.10, 2.11, 2.37

Description of Activity (Briefly Explain the Integration Activity That Was Conducted):

Students of P.T. & Physics study four major systems: Mechanical, electrical, Thermal, and Fluid. Any and all that I do in class is directly related to Mr. Tackett's Auto Mechanics class. For example, OHM's Law in Electricity, in P.T. class is used, in elec. systems in an auto color-coded resistors, parallel and series circuits are made, measured, and evaluated. Fluid flow and heat flow rates help control a.c. and radiator functions. Mechanical resistance and friction regulate tire pressure and traction to road. We measure pressure/force in pistons/cylinders. We can calculate a flow rate through all kinds of filters. All we do in class in theory is used practically in his class. We also do a standard lab write-up sheet.

Academic/Vocational Areas Involved:

Mathematics
Auto Tech

	Academic Teacher	Vocational Teacher
Name:	Greg Wells	Danny Guffey
Address:	Wayne County High School Cardinal Way Monticello, KY 42633	KY Tech-Wayne County Cardinal Way Monticello, KY 42633
Phone:	606-348-5575	606-348-8424
Fax:	606-348-8714	606-348-5090

KERA Academic Expectations:

1.7, 1.8, 1.9, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 2.13, 5.3, 5.4, 5.5, 6.1, 6.2, 6.3.

Description of Activity:

The math teacher and auto tech teacher discussed how fractions and decimals are used in their respective classes.

The two classes of students joined for explanation and practice of real work situations using fractions and decimals in wheel balancing, micrometers, and wheel alignment equipment.

In the classroom the math teacher explained fractions, decimals, etc. and then went into the auto tech lab and saw first-hand how these math principles are necessary in the automotive field.

Suggested Time Needed to Complete the Activity:

Two hours

Academic/Vocational Areas Involved:

Science
Automotive Technology

	Academic Teacher	Vocational Teacher
Name:	Gordon Parmley	Robert McDowell
Address:	Harrison County HS 552 Webster Ave. Cynthiana, KY 41031	KY Tech-Harrison County Center 551 Webster Ave. Cynthiana, KY 41031
Phone:	606-234-7117	606-234-5286
Fax:	606-234-8164	606-234-0658

KERA Academic Expectations:

2.1, 2.3, 6.1, 6.2, 6.3.

Description of Activity:

Mr. Parmley brought his 9th grade class to the Automotive Technology class for instruction by Mr. McDowell about the states of matter, methods of heat transfer, heat movement, heat measurement and the actions of pressure on those concepts as related to automotive air conditioning systems and the new refrigerants in use today.

Suggested Time Needed to Complete the Activity:

Two hours

Academic/Vocational Areas Involved:

Science
Automotive Technology

	Academic Teacher	Vocational Teacher
Name:	Gordon Parmley	Robert McDowell
Address:	Harrison County HS 552 Webster Ave. Cynthiana, KY 41031	KY Tech-Harrison County Center 551 Webster Ave. Cynthiana, KY 41031
Phone:	606-234-7117	606-234-5286
Fax:	606-234-8164	606-234-0658

KERA Academic Expectations:

2.1, 2.3, 6.1, 6.2, 6.3.

Description of Activity:

Mr. Parmley came to the automotive classroom to instruct the students in both classes, the 9th grade Science class and the Automotive Technology class on the chemical reactions of various chemicals their uses as they apply to the automobile and its systems, i.e.: A battery, its acid and how it creates corrosion by chemical reaction, how acid and corrosion react to various chemicals used in/on automobiles and for cleaning; the negatives of these chemical reactions was highly stressed for safety reasons. Mr. McDowell assisted with demonstration of different chemicals and their reactions relative to automobile system components.

Suggested Time Needed to Complete the Activity:

Two hours

Academic/Vocational Areas Involved:

Science
Automotive Technology

	Academic Teacher	Vocational Teacher
Name:	Gordon Parmley	Robert McDowell
Address:	Harrison County HS 552 Webster Ave. Cynthiana, KY 41031	KY Tech-Harrison County Center 551 Webster Ave. Cynthiana, KY 41031
Phone:	606-234-7117	606-234-5286
Fax:	606-234-8164	606-234-0658

KERA Academic Expectations:

2.1, 6.1, 6.2, 6.3.

Description of Activity:

Mr. Parmley came to the automotive classroom to instruct the students in both classes, the 9th grade Science class and the Automotive Technology class on elements and their particular uses as they apply to the automobile and its components; i.e.: Black cast iron versus aluminum with steel inserts, plastics versus wood or steel. Mr. McDowell assisted with demonstration of different elements and how they are used in the automobile.

Suggested Time Needed to Complete the Activity:

Two hours

Academic/Vocational Areas Involved:

Science
Automotive Technology

	Academic Teacher	Vocational Teacher
Name:	Gordon Parmley	Robert McDowell
Address:	Harrison County HS 552 Webster Ave. Cynthiana, KY 41031	KY Tech-Harrison County Center 551 Webster Ave. Cynthiana, KY 41031
Phone:	606-234-7117	606-234-5286
Fax:	606-234-8164	606-234-0658

KERA Academic Expectations:

2.1, 2.3, 6.1, 6.2, 6.3.

Description of Activity:

Mr. Parmley came to the automotive classroom to instruct the students in both classes, the 9th grade Science class and the Automotive Technology class on energy and energy conversions, and with the assistance of Mr. McDowell were able to apply those concepts to the modern day automobile systems, i.e.: The internal combustion engine and electrochemical battery.

Suggested Time Needed to Complete the Activity:

Two hours

Academic/Vocational Areas Involved:

Science
Automotive Technology

	Academic Teacher	Vocational Teacher
Name:	Gordon Parmley	Robert McDowell
Address:	Harrison County HS 552 Webster Ave. Cynthiana, KY 41031	KY Tech-Harrison County Center 551 Webster Ave. Cynthiana, KY 41031
Phone:	606-234-7117	606-234-5286
Fax:	606-234-8164	606-234-0658

KERA Academic Expectations:

2.3, 2.7, 2.10, 2.37, 6.1, 6.2, 6.3.

Description of Activity:

The students from the 9th grade Science class came to the automotive technology classroom after instruction in the basics of the metric system of measurement. Automotive technology students instructed the students in applying concepts from their metric and measurement unit in the auto lab, using instruments and metric hand tools they were able to determine size and pitch of metric fasteners as well as other uses of metric measuring devices such as measuring engine pistons, brake components and tire classifications.

Suggested Time Needed to Complete the Activity:

Two hours

Academic/Vocational areas involved:

Science/Automotive Technology

Suggested time needed to complete the activity:

Approximately two weeks

Academic Teacher

Name: Lee Stead

Address: Southern High School
8620 Preston Hwy
Louisville, KY 40219

Phone: 502-485-8330

Vocational Teacher

Steve Winebrenner

KERA Academic Expectations addressed by this activity:

1.1, 1.2, 1.3, 1.4, 1.12, 2.2, 2.8, 2.10, 2.22, 2.37, 5.1, 5.2, 5.3, 5.4, 6.3

Description of Activity:

The purpose of the activity (Scrambled Egg Derby) was to design and build a vehicle chassis that manages energy during a collision and keeps the occupants (two raw eggs) safe when the vehicle collides with a fixed barrier.

The vehicle chassis must incorporate design concepts and materials that achieve a speed of eight feet per second. The dimensions of the exterior of the vehicle could not be altered from the dimensions given the student nor could the barrier be altered to soften the blow. Students were divided into groups and given the dimensions and blueprint for the car to be constructed. They were given materials for the car such as construction paper, sponges, rubber bands, clothes pins, scissors, wheels and axles, glue, and craft sticks.

A sixteen foot ramp with a barrier and computer timing devices were constructed and used to test the vehicles once the cars were completed. Students could make modifications inside the vehicle to assure a safe vehicle, such as seat belts, etc. Once the vehicles were constructed, they were allowed to test the vehicle on the ramp and make adjustments as needed. Each team was asked to record the data from testing and record changes made as a result of testing.

At the conclusion of the construction, testing, and adjustments, one day was set aside as the Scrambled Egg Derby Day and all vehicles were required to race on the ramp. Students were also asked to collect data from the actual crash day.

At the conclusion of the Derby, students were required to write a paper that focuses on energy management during a collision and include the data collected. The paper had to answer the question: Which is more important to energy management, design before construction or materials used during construction?

This activity emphasized Science principles of friction, weight/mass, energy management, force, design, and analysis. Students from the science class helped the students on these principles as they designed and modified their vehicles. Math concepts of formulas (speed/distance); measuring; angles and data manipulation and calculation were also emphasized.

For more information and specific layout details for the vehicle, contact Steve Winebrenner at Southern High School.

Academic/Vocational areas involved:

Science/Automotive Technology/Telecommunications

Suggested time needed to complete the activity:

2 weeks

Academic Teacher

Name: Lee Stead

Address: Southern High School
8620 Preston Hwy
Louisville, KY 40219

Phone: 502-485-8330

Vocational Teacher

Steve Winebrenner
Peter Lucchesi

KERA Academic Expectations addressed by this activity:

1.1, 1.2, 1.3, 1.4, 1.12, 1.16, 2.1, 2.2, 2.3, 2.7, 2.8, 2.10, 2.13, 2.22, 2.23, 5.1, 5.2, 5.3, 5.4, 5.5, 6.1, 6.2, 6.3

Description of Activity:

Science and Automotive Technology students co-operated in the design, construction, and evaluation of Pinewood Derby Cars. Science students from grades 11 and 12 shared information on friction, energy, momentum, impulse, and efficiency with 9th grade students enrolled in Introduction to Transportation (Auto Tech) classes at the beginning of the project. The science and Auto Tech students worked together in the design of each of the cars. The actual construction of the cars was left to the Auto Tech students. Once the cars were completed, they were raced on a 30 foot gravity power track. The computer timing interface and final velocity timing devices were constructed by students in the telecommunications class.

The science students collected data about each car and its performance on the track. The science students then analyzed the data. Topics explored by the science students included, but were not limited to, potential energy, kinetic energy, friction, drag, aerodynamics, momentum, mass, weight, impulse, velocity, and time. Math concepts included averaging and using formulas to determine values for energy, efficiency, etc.

Telecommunications students gained experience in the construction and troubleshooting of digital devices and the construction and troubleshooting of photo devices (used in the gates).

Auto Tech students delved into problems and finding solutions involving three-dimensional thinking (seeing things in space rather than flat): auto aerodynamics, auto design, friction, Bernoulli principle and automotive history. Students performed many hands-on activities in the design, cutting out, sanding, and painting of the block of wood into a car. During the design, trial, and redesign procedures, students expanded their problem solving experience.

SUGGESTED INTEGRATION PRACTICES FOR ACADEMIC/VOCATIONAL EDUCATION PROGRAM(S)

Academic/Vocational Areas Involved:

Science/Electricity

Suggested Time Needed to Complete This Activity:

10 hours

Name of Schools:

Lee County High School/Lee County AVEC

Name of Vocational Teacher(s):

John Cook

Name of Academic Teacher(s):

Susan Easter

School Address:

P.O. Box 97, Beattyville, KY 41311/P.O. Box B, Beattyville, KY 41311

Telephone Number:

(606) 464-5005/(606) 464-5018

KERA Learner Standard(s) (I-75) Addressed By This Activity - List The Standard(s) In Brief Form:

2.3, 2.34
5.3

Description of Activity (Briefly Explain The Integration Activity That Was Conducted):

The science and electricity classes combined to learn about concepts in electricity in a theoretical sense. Topics covered included electrical safety, electrical charge, static electricity, current flow, series, parallel and combination circuits. The classes then did practical application of these concepts by building different electrical circuits.

SUGGESTED INTEGRATION PRACTICES FOR ACADEMIC/VOCATIONAL EDUCATION PROGRAM(S)

Academic/Vocational Areas Involved:

Science/Electricity

Suggested Time Needed to Complete This Activity:

6 hours

Name of Schools:

Lee County High School/Lee County AVEC

Name of Vocational Teacher(s):

John Cook

Name of Academic Teacher(s):

Susan Easter

School Address:

P.O. Box 97, Beattyville, KY 41311/P.O. Box B, Beattyville, KY 41311

Telephone Number:

(606) 464-5005/(606) 464-5018

KERA Learner Standard(s) (I-75) Addressed By This Activity - List The Standard(s) In Brief Form:

2.1, 2.34
5.5

Description of Activity (Briefly Explain The Integration Activity That Was Conducted):

The science and electricity classes studied principles of magnetic fields, electromagnets and solenoids. The class applied the knowledge they had acquired to build electromagnets out of copper wire. They then tested their magnets for strength - the amount of weight each would lift.

PHYSICS / NURSING

School/District: Cumberland High	**Subject: Physics of Movement**
Academic Contact: Jeff Smith **Address: 600 Redskin Drive** **Cumberland, KY 40823** **Phone: (606) 589-4625** **FAX: (606) 589-2312**	**Vocational Contact: Bill Scott** **Address: 600 Redskin Drive** **Cumberland, KY 40823** **Phone: (606) 589-4625** **FAX: (606) 589-2312**
Time Frame: 2 periods	**Grade Level: 11 - 12**
KERA Academic Expectations: 2.3	

Description of Activity:

Students will work in Mastery Learning groups. Nursing students will "teach" the other members of their group about soft tissue and connective tissue injuries. Physics students will "teach" about levers and torque.

Heterogeneous groups will design, write-up, and perform an experiment to determine the actual lifting force of the bicep and compare that force to the weight of the lifted object.

Suggested Materials/Resources:

Calculators, Rulers, Free Weights (dumbbells).

Academic/Vocational areas involved:

Mass Media Communication/Automotive Collision Repair

Suggested time needed to complete the activity:

Three class periods and outside work

	Academic Teacher	**Vocational Teacher**
Name:	Pam Bruenig	Howard E. Carey
Address:	Marion Co. High School 735 East Main St. Lebanon, KY 40033	Marion Co. AVEC 721 East Main St. Lebanon, KY 40033
Phone:	502-692-6066	502-692-3155

KERA Academic Expectations addressed by this activity:

1.1, 1.4, 1.11, 1.12, 1.13, 2.7, 2.17, 2.18, 2.22, 2.30, 2.36, 2.37, 2.38, 6.1, 6.2, 6.3

Description of Activity:

Students in Automotive Collision Repair will work in groups of 5 to establish an inventory of cars to be sold on a local lot. Each group will write a description of the inventory. The best written portfolio will be selected to set up an advertisement and video commercial on location for the proposed car sales lot. Prior to the project, instruction will be provided in the following areas to both classes:

1. Overview of the roles of Advertising
2. Marketing--the activities involved in developing a product, establishing a price for the product, and distributing and promoting the product.
3. Marketing strategies
4. Advertising as Persuasive Communication
5. Components of Successful Advertisement--Product Claim; Emotional Appeal; Target Audience

Academic/Vocational Areas Involved:

Mathematics
Electricity

	Academic Teacher	Vocational Teacher
Name:	Vickie R. Buckle	Randy Lewis
Address:	Leslie County High School P.O. Box 970 Hyden, KY 41749	KY Tech-Leslie County P.O. Box 902 Hyden, KY 41749
Phone:	606-672-2337	606-672-2859
Fax:	606-672-2858	606-672-5220

KERA Academic Expectations:

1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.16, 2.1, 2.2, 2.3, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 2.13, 2.22, 2.23, 2.30, 2.36, 2.37, 3.0, 4.0, 5.1, 5.2, 5.3, 5.4, 5.5, 6.1, 6.2, 6.3.

Description of Activity:

The math teacher showed how the trigonometric functions of sine and cosine are used to describe waves and the motion of waves. The electricity teacher then explained how AC and DC voltages differ. The students observed these differences on an oscilloscope.

Students were given a description of how a sine wave has 360 geometric degrees. Electrical degrees were then compared to geometric degrees and their differences were discussed. The students learned that electrical degrees differ from geometric degrees due to the number of pole pairs in a generator and how revolutions work to make frequency.

The students observed how different electrical components can change the sine wave due to their properties. They were given transformers and digital volt-ohm meters to hook-up; voltage readings were taken on the primary and secondary sides of a transformer.

Suggested Time Needed to Complete the Activity:

One hour a day for three days

Academic/Vocational areas involved:

Science/Electronics

Suggested time needed to complete the activity:

3 hours

Academic Teacher

Name: Mike Boemker

Address: Pleasure Ridge Park High School
5901 Greenwood Road
Louisville, KY 40258

Phone: 502-485-8311

Vocational Teacher

Dan Adams

KERA Academic Expectations addressed by this activity:

I.8, I.9, I.II, 2.I, 2.4, 2.8, 2.10

Description of Activity:

The science class was first introduced to concepts in electronics in a theoretical sense. Topics covered included electrical charge, current flow, Ohm's Law, series circuits and parallel circuits. The class then joined Electronics students in the Electronics lab and was grouped with electronics students to do practical application of these concepts by building different electrical circuits. The electronic students served as tutors and helped guide the science students through the application activities. This provided an opportunity to reinforce the science principles they had learned. The following worksheet was given to the students to complete.

WS OHM'S LAW / SERIES AND PARALLEL CIRCUITS

E

I R

Part A: Series Circuit

	Calculated			Measured	
	E	I	R	E	I	R
T	15V			T		
R1		220		R1		
R2			1,000	R2		
R3			100	R3		

Conclusion: Compare the calculated values to the measured values. Why might they differ?

Procedure: Replace the 220 and I,000 resistors with light bulbs. Remove one bulb from the circuit. What do you observe? Why do you think this occurs?

Part B: Parallel Circuits

Procedure: Replace the 220 and I,000 resistors with light bulbs. Remove one bulb from the circuit. What do you observe? Why do you think this occurs?

Questions:

1) Which type circuit should be used when designing Christmas tree lights? Explain why.
2) What type circuit should be used when wiring a house? Explain why.
3) What type circuit should be used when designing a home security system? Explain why.
4) Which type circuit should be used if you have limited resources? Explain why.

ELECTRICITY/MATH

School/District: Garrard County H.S.

Subject: Use of Positive and Negative Numbers in Electricity

Academic Contact: Susan McLaren
Address: 307 W. Maple Ave.
Lancaster, KY 40444
Phone : (606) 792-2146
Fax:

Vocational Contact: David Horseman
Address: 308 W. Maple Ave.
Lancaster, KY 40444
Phone: (606) 792-2144
Fax:

Time Frame: Two (2) 55 minute periods

Grade Level: 9-12

KERA Academic Expectations: 2.7, 2.10, 6.1, 6.2, 6.3

Description of Activity:

The following activity is planned for both Algebra I and Electricity classes. During this activity both classes will meet in the electrical lab for instruction. The electrical teacher will first explain the concept of tolerance with respect to resistance. The math teacher will then explain how to calculate tolerance. Then the group will take readings of known resistor values and determine if the measured values fall within manufacturer tolerances.

Suggested Materials/Resources:

Resistors, VOMs, calculators

ELECTRICITY/MATH

School/District: Garrard County H.S.

Subject: Trig Functions/Power Factor

Academic Contact: Susan McLaren
Address: 307 W. Maple Ave.
Lancaster, KY 40444
Phone : (606) 792-2146
Fax:

Vocational Contact: David Horseman
Address: 308 W. Maple Ave.
Lancaster, KY 40444
Phone: (606) 792-2144
Fax:

Time Frame: Two (2) 55 minute periods

Grade Level: 9-12

KERA Academic Expectations: 2.7, 2.9, 2.10, 6.1, 6.3

Description of Activity:

The following activity is planned for students in Geometry and Electricity. During this activity the students will meet in the electrical lab for instruction. The electrical teacher will explain the concept of power factor as it relates to angle theta. The math teacher will then explain the trigonometric functions. The students will then use trig functions to calculate true power/reactive/apparent power and power factor. The students will also use TI-82 calculators to graph the different functions.

Suggested Materials/Resources:

Calculators

ELECTRICITY/MATH

School/District: Garrard County H.S.	**Subject: Simultaneous Equations/ Combination Circuits**
Academic Contact: Susan McLaren **Address: 307 W. Maple Ave.** **Lancaster, KY 40444** **Phone : (606) 792-2146** **Fax:**	**Vocational Contact: David Horseman** **Address: 308 W. Maple Ave.** **Lancaster, KY 40444** **Phone: (606) 792-2144** **Fax:**
Time Frame: For (4) 55 minute periods	**Grade Level: 9-12**

KERA Academic Expectations: 2.7, 2.8, 2.11, 6.1, 6.3

Description of Activity:

The following activity is planned for both Algebra I and Electricity classes. During this activity both classes will meet in the electricity lab for instruction. The electrical teacher will explain Kirchhoff's Voltage Law and its application with Ohm's Law in the development of simultaneous equations. The math teacher will then explain how to solve simultaneous equations. Then the class will be divided into groups of two, one from each class, and work some practice problems. The class will then build one of the circuits discussed in the practice problems.

Suggested Materials/Resources:

Resistors, VOMs, Power Supplies, Calculators

Comments:

Optional method. Electricity provides handout with circuits using simultaneous equations.

ELECTRICITY/MATH

School/District: Garrard County H.S.	**Subject: Pythagorean Theorem/Impedance**
Academic Contact: Susan McLaren **Address: 307 W. Maple Ave.** **Lancaster, KY 40444** **Phone : (606) 792-2146** **Fax:**	**Vocational Contact: David Horseman** **Address: 308 W. Maple Ave.** **Lancaster, KY 40444** **Phone: (606) 792-2144** **Fax:**
Time Frame: One (1) 55 minute period	**Grade Level: 9-12**

KERA Academic Expectations: 2.7, 2.8, 2.10, 6.1, 6.3

Description of Activity:

The following activity is planned for both Geometry and Electricity classes. During this activity both classes will meet in the electricity lab for instruction. The electrical teacher will explain the relationship between resistance, reactance and impedance in a series RL circuit. Then the math teacher will explain how the Pythagorean Theorem can be used to solve problems dealing with these concepts. The students will then work together to solve problems.

Suggested Materials/Resources:

Calculators

ELECTRICITY/MATH

School/District: Garrard County H.S.

Subject: Fractional Equations/Parallel Circuits

Academic Contact: Susan McLaren
Address: 307 W. Maple Ave.
Lancaster, KY 40444
Phone : (606) 792-2146
Fax:

Vocational Contact: David Horseman
Address: 308 W. Maple Ave.
Lancaster, KY 40444
Phone: (606) 792-2144
Fax:

Time Frame: Two (2) 55 minute periods

Grade Level: 9-12

KERA Academic Expectations: 2.7, 2.8, 2.10, 6.1, 6.3

Description of Activity:

The following activity is planned for both Algebra I and Electricity classes. During this activity both classes will meet in the electricity lab for instruction. The electrical teacher will explain the concept of parallel resistance and develop formulas for circuit reduction. The math teacher will then explain how to solve fractional equations using these types of formulas. The classes will work problems in groups of four. They will then validate their answers with actual measurements.

Suggested Materials/Resources:

Resistors, VOMs, Calculators

Academic/Vocational Areas Involved:

Technology Education, Algebra

	Academic Teacher	Vocational Teacher
Name:	Kathy Clark	Bobby Woods
Address:	Marshall County High School 416 High School Road Benton, KY 42025	
Phone:	(502) 527-1453	
FAX:	(502) 527-0578	

KERA Academic Expectations:

1.3, 1.7, 1.8, 1.9, 1.16, 2.2, 2.4, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 3.7, 5.1, 5.3, 5.4, 5.5

Description of Activity:

DAY ONE - One-half of the Algebra class travels to the Technology Lab for a hands on demonstration of how the coordinate system concept is used with "Auto-Cad". Manual transformations are demonstrated (see attached worksheets) and then the "Auto-Cad" system is utilized.

The other half of the Algebra Class is taught how to use the Graphing Calculator to graph functions and how to locate points of intersection in the coordinate plane.

DAY TWO - Teachers could continue as Day One if more time is needed or switch students and repeat Day One's assignments.

Academic/Vocational Areas Involved:

Mathematics/Machine Tool Technology

	Academic Teacher	Vocational Teacher
Name:	Marquita Crowe	Marc Welch
Address:	Ohio County High School 1400 South Main Hartford, KY 42347	
Phone:	(502) 274-3366	
FAX:	(502) 274-9482	

KERA Academic Expectations:

2.8, 2.10, 6.1, 6.2, 6.3

Description of Activity:

Used ratio and proportion in similar triangles to calculate size of part to be made in machine shop. Students from geometry observed as students in machine shop operated equipment and helped them with handouts computing ratios of gears and parts being made. Geometry students under guidance of machine tool student operators actually operated the equipment and built teeth on gears. Students were each instructed about importance of safety and precision on the job.

Time: 1 - 85 minute block

MACHINE SHOP/PHYSICS

School/District: Cumberland High	**Subject: Exercise Enterprise**
Academic Contact: Jeff Smith **Address: 600 Redskin Drive** **Cumberland, KY 40823** **Phone: (606) 589-4625** **FAX: (606) 589-2312**	**Vocational Contact: Bill Scott** **Address: 600 Redskin Drive** **Cumberland, KY 40823** **Phone: (606) 589-4625** **FAX: (606) 589-2312**
Time Frame: Variable	**Grade Level: 11-12**
KERA Academic Expectations: 2.1	

Description of Activity:

Mastery Learning groups - each group will come to this activity knowing each of their master areas.

Physics - Knowledge of simple machines and torque.

Machine Shop/Welding - Knowledge of strength of materials/manufacturing.

Learning groups will choose and analyze a weighted exercise machine to construct in a cooperative environment. Each group will first evaluate at least one existing design, for a device of their choosing, and then design and build an improved version.

Suggested Materials/Resources:

Good Sponsor. Students will identify their needed materials, do a cost analysis and negotiate pricing with the sponsor.

SUGGESTED INTEGRATION PRACTICES FOR ACADEMIC/VOCATIONAL EDUCATION PROGRAM(S)

Academic/Vocational Areas Involved:

Mathematics/Welding

Suggested Time Needed to Complete This Activity:

1 month

Name of Schools:

Lee County High School/Lee County AVEC

Name of Vocational Teacher(s):

Jeff Perdue

Name of Academic Teacher(s):

Danny Partin

School Address:

P.O. Box 97, Beattyville, KY 41311/P.O. Box B, Beattyville, KY 41311

Telephone Number:

(606) 464-5005/(606) 464-5018

KERA Learner Standard(s) (I-75) Addressed By This Activity - List The Standard(s) In Brief Form:

2.1, 2.4, 2.9, 2.10

Description of Activity (Briefly Explain The Integration Activity That Was Conducted):

Mathematics students were given a thorough lesson in ratios and measurement conversion concepts. Welding students studied the construction of the original Gateway Arch in St. Louis. The two classes combined to build a replica of the Arch, 10 inches in diameter using the mathematical formulas learned in the math class.